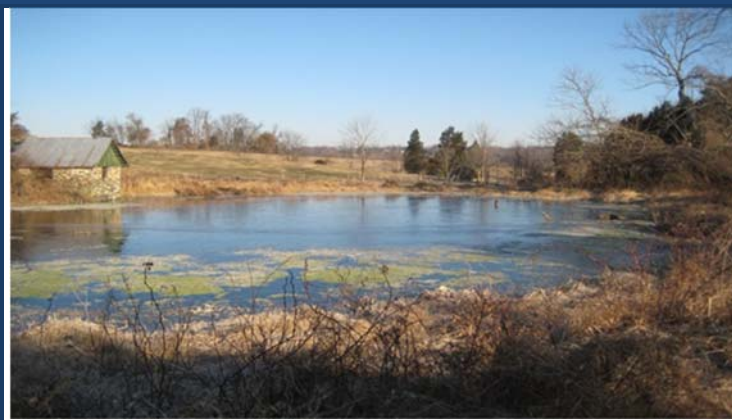




Swan Creek Watershed Total Maximum Daily Load Restoration Plan for Sediment

September 2017



Prepared for:
Harford County
Department of Public Works
212 South Bond Street
Bel Air, MD 21014

AECOM

Prepared by:
AECOM
12420 Milestone Center Drive,
Suite 150
Germantown, MD 20876

**SWAN CREEK WATERSHED
TOTAL MAXIMUM DAILY LOAD
RESTORATION PLAN FOR SEDIMENT**

September 2017

Prepared for:

**Harford County
Department of Public Works
212 South Bond Street
Bel Air, MD 21014**

Prepared by:

**AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876**

TABLE OF CONTENTS

SECTION ONE: INTRODUCTION 1-1

1.1 WATERSHED DESCRIPTION 1-3

1.2 MDE DESIGNATED USE OF SURFACE WATERS..... 1-3

1.3 MARYLAND HIGH QUALITY WATERS (TIER II) 1-3

1.4 DEVELOPMENT OF TMDL FOR SWAN CREEK..... 1-5

1.5 SOURCES OF IMPAIRMENT 1-5

1.6 TMDL ALLOCATION FOR STORMWATER WAST LOAD ALLOCATIONS 1-6

1.7 REQUIREMENTS OF A TMDL RESTORATION PLAN 1-6

SECTION TWO: RESTORATION STRATEGY 2-1

2.1 RESTORATION STRATEGY 2-1

2.2 IMPLEMENTATION COSTS 2-1

2.3 IMPLEMENTATION SCHEDULE 2-1

Figures

- Figure 1-1: Watershed Location Map
- Figure 1-2: MDE Designated Use for Surface Waters in Swan Creek Watershed

Tables

- Table 1-1: EPA Approved TMDLs in Harford County
- Table 1-2: Stormwater Point Sources in Swan Creek Watershed
- Table 1-3: Load Reductions for Stormwater Point Sources in Swan Creek Watershed
- Table 2-1: Stream Restoration Strategy for Swan Creek

12-SW	Industrial General Permit for Stormwater Discharges
BMP	best management practice
BSID	Biological Stress Identification
CBP	Chesapeake Bay Program
CIP	Capital Improvement Program
COMAR	Code of Maryland Regulations
County	Harford County
CWA	Clean Water Act
DPW	Harford County Department of Public Works
EOS	Edge of stream
EPA	U.S. Environmental Protection Agency
ESC	Erosion and Sediment Control
ESD	environmental site design
GIS	geographic information system
HOA	Homeowners Association
HSG	Hydrologic Soil Group
lb	pound
MDE	Maryland Department of the Environment
MD SHA	Maryland State Highway Administration
MGD	millions of gallons per day
mg/l	milligrams per liter
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
SPSC	step pool storm conveyance system
TMDL	Total Maximum Daily Load
TSS	total suspended solids

SECTION ONE: INTRODUCTION

The Swan Creek Watershed Total Maximum Daily Load (TMDL) Restoration Plan for sediment, developed by Harford County (County) Department of Public Works (DPW), will serve as a guideline for the County to reduce sediment in the Swan Creek Watershed. This TMDL was established by Maryland Department of Environment (MDE) and approved by U.S. Environmental Protection Agency (EPA) in September 2016.

On December 30, 2014 MDE reissued the Phase I National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit to the County. The permit has several new requirements, including stringent stormwater management criteria, implementation of strategies to reduce litter and floatables and development of restoration plans. Part IV.E.2.b of the NPDES MS4 permit requires the County to develop restoration plans to address stormwater wasteload allocations (SW-WLAs) for all the waterbodies in the County which have EPA approved TMDLs. Attachment B of the County's NPDES MS4 permit lists eight waterbodies in the County which have local and Chesapeake Bay TMDLs for various impairments. Since the County's MS4 permit was issued TMDLs were approved for the Bush River for PCBs and Swan Creek for Sediment. Table 1-1 lists the watersheds, type of TMDL, and the impairment.

Table 1-1: EPA Approved TMDLs in Harford County

Type of TMDL	Watershed	Impairment
Local	Bush River	PCBs
	Bynum Run	Sediment
	Swan Creek	Nutrients and Sediment
	Loch Raven Reservoir (Non-Tidal)	Bacteria
	Loch Raven Reservoir	Mercury
	Loch Raven Reservoir	Nutrients and Sediment
Chesapeake Bay	Bush River Oligohaline	Nutrients and Sediment
	Gunpowder River Oligohaline	Nutrients and Sediment
	Chesapeake Bay Mainstem 1 Tidal Fresh	Nutrients and Sediment
	Chesapeake Bay Mainstem 2 Oligohaline	Nutrients and Sediment

This Plan only addresses the Swan Creek TMDL for sediment. The Swan Creek Watershed (MDE 8-digit: 02130706), a subwatershed of the Northern Chesapeake Bay Tidal Fresh Watershed (MDE: CB1TF), lies entirely in Harford County and includes, Aberdeen Proving Grounds (APG), a federal Phase II NPDES MS4 community and the cities of Aberdeen and Havre de Grace, municipal Phase II NPDES MS4 communities. The watershed also includes State-owned properties and State highways. Figure 1-1 shows the location of the Swan Creek Watershed in the County.

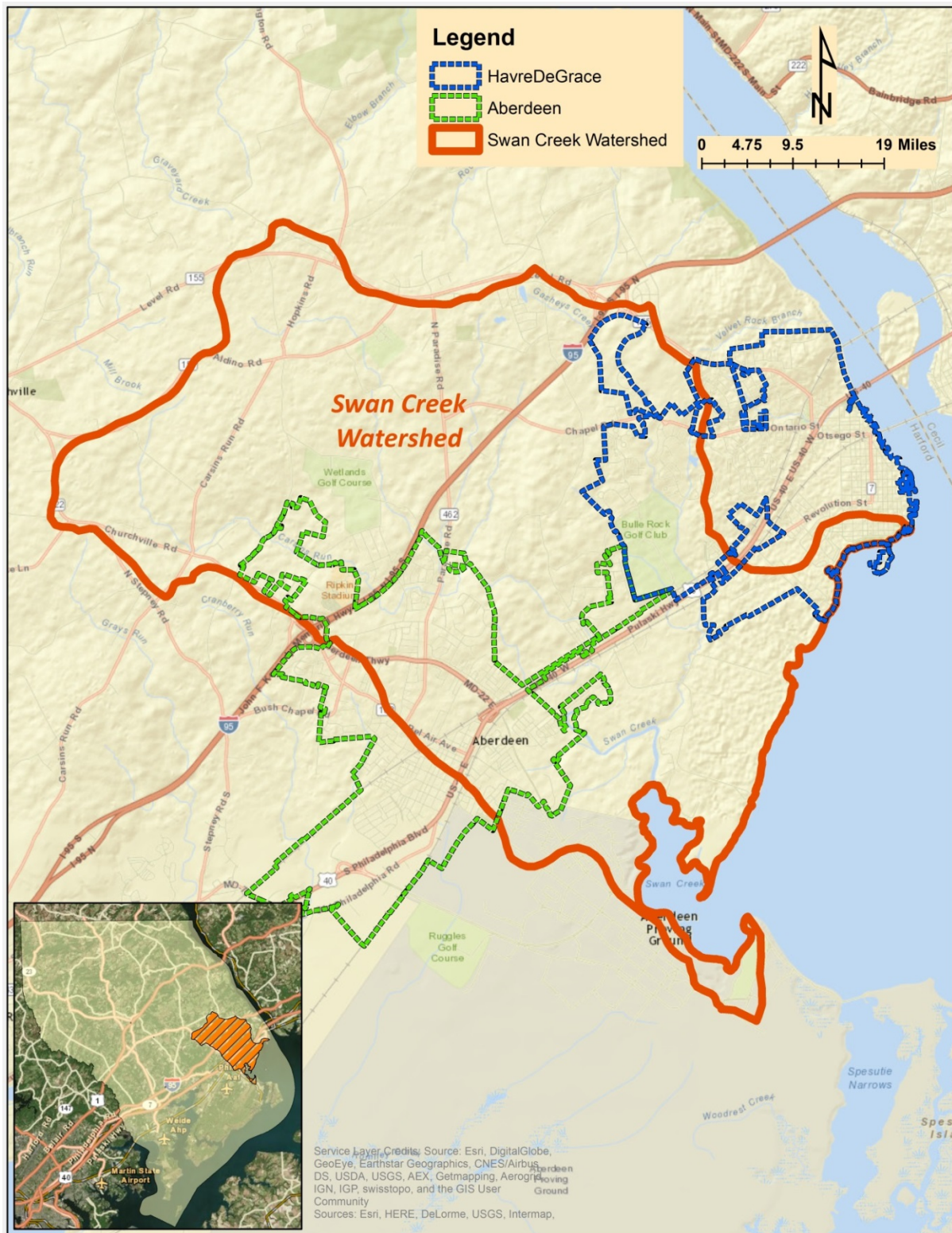


Figure 1-1: Watershed Location Map

1.1 WATERSHED DESCRIPTION

Swan Creek Watershed is in the southeastern portion of Harford County. The watershed's approximate borders include Route 155 to the north, Canvasback Drive to the northeast, Chesapeake Bay to the southeast, and Bel Air Avenue to the southwest. Approximately 60 percent of the City of Aberdeen and 45 percent of the City of Havre de Grace is in the Swan Creek Watershed.

Swan Creek headwaters are located just east of the Harford County Airport, and extends southeast to the confluence with Gashey's Creek south of Pulaski Highway. These streams converge and drain to Chesapeake Bay at Swan Creek Point. Gashey's Creek is a critical habitat for the federally endangered Maryland darter.

1.2 MDE DESIGNATED USE OF SURFACE WATERS

MDE has classified all the water bodies in the State including streams, impoundments and tidal waters based on their designated use [Code of Maryland Regulations (COMAR) Section 26.08.02.08].

The majority of Swan Creek and its tributaries are classified as Designated Use Class I waters, which support water contact recreation, propagate growth of fish (not trout) and other aquatic life, fishing, and agricultural and industrial water supply. The downstream segment of Swan Creek between U.S. Route 40 (Pulaski Highway) and the Bay is Designated Use Class II, which in addition to the Class I activities, supports prorogation of shellfish, migratory fish spawning, fish and shellfish use, and seasonal deep-channel refuge use. There are no impoundments in the watershed. The receiving waterbody, Northern Chesapeake Bay Tidal Fresh, is Class II-P and supports all activities above as well as being a source of public potable water (Figure 1-2).

1.3 MARYLAND HIGH QUALITY WATERS (TIER II)

According to COMAR 26.08.02.04-1, high quality waters (Tier II) are where the water quality is better than the minimum requirements specified by the water quality standards. MDE restricts any watershed restoration or other activities that would affect Tier II waters, including new discharges or major modifications to existing discharges to these high quality waterbodies. MDE data indicate that there are no Tier II waters in the Swan Creek Watershed; therefore, restoration project locations are not restricted within the watershed.

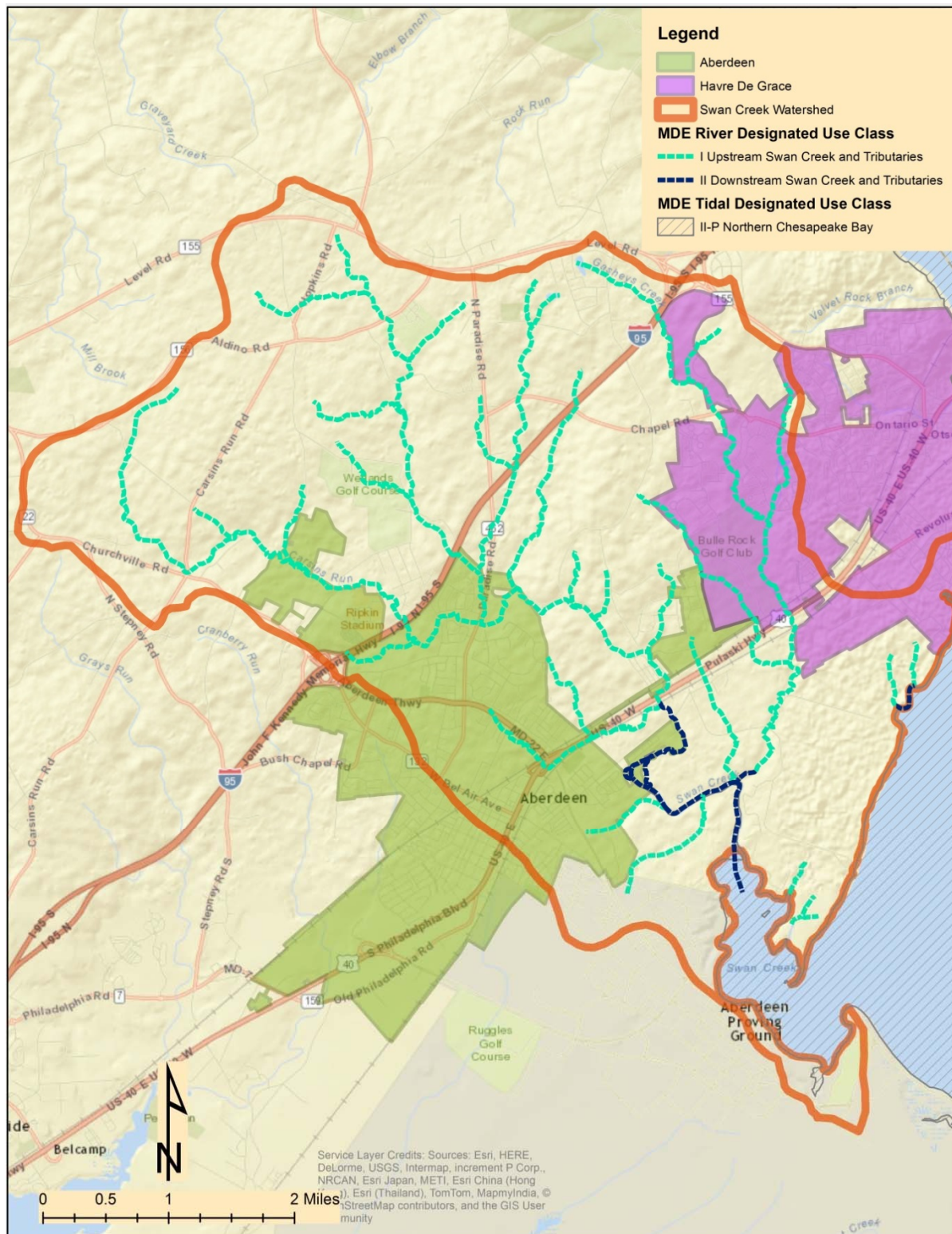


Figure 1-2: MDE Designated Use for Surface Waters in Swan Creek Watershed

1.4 DEVELOPMENT OF TMDL FOR SWAN CREEK

A TMDL is a calculation of the maximum amount of a pollutant a water body can receive and still meet the State water quality standards and designated uses. TMDLs are generally developed using pollutant load models or mathematical models which are calibrated using monitoring data.

Swan Creek was identified as impaired by sediment in the 2014 Integrated Report developed by MDE for Sections 305(b) and 303(d) of the Clean Water Act (CWA). To estimate the impact of sediment loads, MDE performed a Biological Stressor Identification (BSID) Analysis. Based on the results of the analysis, MDE concluded that biological communities within the non-tidal portions of the watershed were impacted by low dissolved oxygen saturation and high pH from altered flow/sediment and instream habitat stressors.

The Chesapeake Bay Program P5.3.2 watershed model was used to estimate the sediment loads within Swan Creek and specifically used the edge of stream (EOS) sediment loads. These baselines were used to assign reduction goals for the Swan Creek Watershed.

In September 2016, EPA approved the Swan Creek TMDL for sediment. The baseline load is 770 tons per year with the TMDL goal of 729 tons per year, or an overall 5% reduction in loading within the entire watershed.

1.5 SOURCES OF IMPAIRMENT

The TMDL document developed by MDE quantified sediment loads from point and non-point sources in the watershed. The only reduction MDE has assigned is for urban stormwater despite the fact that the watershed is comprised of 33 percent row crops (TMDL document, Table 5) verses 53 percent regulated urban.

1.5.1 Non-Point Sources

Non-point sources of sediment loads include crop, pasture, and forest. MDE's TMDL document identified that approximately 35 percent of the total sediment loads in the watershed are from agricultural areas, and that forest areas contribute approximately 12 percent of the total sediment loads. The total sediment load from non-point sources is 361 tons per year. MDE assigned no load reductions for non-point sources.

1.5.2 Point Sources

Several permitted point sources in the watershed were identified in the Swan Creek Watershed. These permitted sources are identified in Table 1-2. The total load from point sources is 407 tons per year. The Swan Harbor Dell Mobile Home Park was also identified as a point source within the Swan Creek Watershed contributes 2 tons/year, but was not assigned a load reduction. The Town of Bel Air identified in MDE's TMDL document, is not in the Swan Creek Watershed. It is in the Bynum Run and Winters Run watersheds and is therefore not included in Table 1-2.

Table 1-2: Stormwater Point Sources in Swan Creek Watershed

Facility Name	Permit Type	Contribution of Point Source Loads (%)
Harford County	NPDES MS4 Phase I	15
City of Aberdeen	NPDES MS4 Phase II	43
City of Havre de Grace	NPDES MS4 Phase II	
State Highway Administration	NPDES MS4 Phase I	
Comer Construction, Inc.	Other NPDES	33
Harford Systems, Inc.	Other NPDES	
Plastipak Packaging, Inc.	Other NPDES	
Smuckers Quality Beverages, Inc.	Other NPDES	
MDE General Permit to Construct	Other NPDES	
		100

1.6 TMDL ALLOCATION FOR STORMWATER WASTE LOAD ALLOCATIONS

TMDL targets were only assigned to the urban sources in the watershed. No targets were assigned to the non-point sources.

The Swan Creek TMDL for sediment requires an overall 5 percent reduction from the baseline. This load reduction was distributed among the stormwater point sources in the watershed. Table 1-3 lists the TMDL load reduction targets for the point sources. Harford County's load reduction is 7 tons/year.

Table 1-3: Load Reductions for Stormwater Point Sources in Swan Creek Watershed

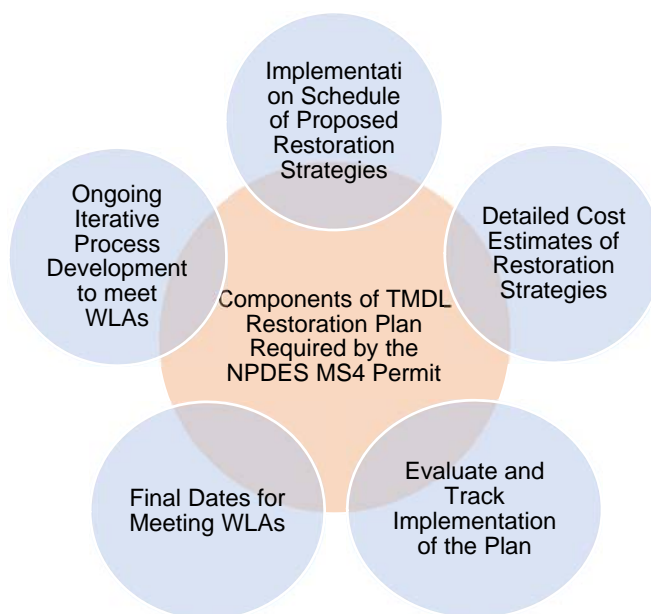
Facility Name	Permit Type	Load Reductions (tons/year)	Required Reduction (%)
Harford County	NPDES MS4 Phase I	7	13
Town of Bel Air	NPDES MS4 Phase II	23	13
City of Aberdeen	NPDES MS4 Phase II		
City of Havre de Grace	NPDES MS4 Phase II		
State Highway Administration	NPDES MS4 Phase I	4	13
Other NPDES Regulated Stormwater	Other NPDES	6	4

1.7 REQUIREMENTS OF A TMDL RESTORATION PLAN

A TMDL Restoration Plan is a roadmap that identifies various water quality improvement strategies that a local jurisdiction can implement to reduce loadings of a particular pollutant in a

specific impaired watershed. The graphic below summarizes MDE's requirements for restoration plans as outlined in the County MS4 permit. The County reserves the right to make arguments regarding the legality of the plan requirements notwithstanding their presentation in this plan. The Swan Creek TMDL focuses only on reducing sediment loads from the urban stormwater portion of the watershed.

The main objective of a TMDL restoration plan is to recommend a wide array of structural, non-structural and/or programmatic management strategies that could be implemented at the watershed-scale level (rather than site specific).



SECTION TWO: RESTORATION STRATEGY

The load reductions necessary to address the TMDL for sediment in Swan Creek are small. The County has chosen to develop a restoration strategy simply focused on stream restoration. Programmatic strategies developed for the County's Chesapeake Bay TMDL Restoration Plan are proposed county-wide and will include the Swan Creek Watershed.

2.1 RESTORATION STRATEGY

Harford County has selected stream restoration to address the County's sediment load reduction of 7 tons/year. Several locations within both the piedmont and coastal plain portions of the watershed have been identified to pursue discussions with property owners. Based on the interim removal rates from the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects (September 2014) a single stream restoration project can be completed to address the sediment load reductions. These calculations are for planning purposes only. Actual load reductions will be calculated using the full recommend protocols outlined in the Expert Panel Document.

Table 2-1: Stream Restoration Strategy for Swan Creek Watershed

Restoration Practice	Sediment Reduction (lbs/year/foot)	Sediment Reduction (tons/year)	Stream Length (feet)
Stream Restoration (non-coastal plain)	44.88 ¹	7	312
Stream Restoration (coastal plain)	15.13 ¹	7	925

¹Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects (February 2013)

2.2 IMPLEMENTATION COSTS

Estimated costs for the design and construction for a stream restoration vary between \$200 and \$500 per linear foot. The construction of a single stream restoration as described within the previous section is estimated to be approximately \$200,000. The County will incorporate this project into its existing capital improvement program for watershed restoration to address the County's MS4 permit.

2.3 IMPLEMENTATION SCHEDULE

Over the next six months, the County will investigate the locations identified for possible restoration. Based on field determined characteristics and coordination with property owners, the County anticipates initiating a project design by June 2018 with construction to be completed by June 2020.